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January 4, 2010

Mr. Mark Prescott, Chief
Deepwater Ports Standards Division (CG-3PSO-5)
United States Coast Guard Headquarters
2100 Second Street, S.W.
Washington, DC 20593

Subject: EPA NEPA Review Comments on USCG "Bienville Offshore Energy Terminal" DSEIS; November 2009; Gulf of Mexico; Docket # USCG-2006-24644; CEQ# 20090396; ERP# CGD-E02013-AL

Dear Mr. Prescott:

Pursuant to Section 309 of the Clean Air Act (CAA) and Section 102(2)(C) of the National Environmental Policy Act (NEPA), the U.S. Environmental Protection Agency (EPA) Region 4 has reviewed the U.S. Coast Guard's (USCG) Draft Supplemental Environmental Impact Statement (DSEIS) for the Deepwater Port Act (DWPA) licensing of the "Bienville Offshore Energy Terminal" (BOET) for receiving and regasifying Liquefied Natural Gas (LNG). The location of the LNG port terminal is proposed for federal waters in the Gulf of Mexico (GOM), 62.6 miles offshore of Fort Morgan, Alabama in water depths of about 425 feet. Some 22.7 miles of interconnecting pipelines would be constructed but would not require trenching/burial by the Minerals Management Service (MMS) at depths greater than 200 feet. The terminal has an average throughput capacity of 1.2 billion standard cubic feet of natural gas per day (Bscfd) and is designed for a 25-year life cycle.

EPA is a cooperating agency for this SEIS. Besides application for a DWP license to the USCG and the Maritime Administration (MARAD), TORP Terminal LP (Applicant) has applied to EPA for National Pollutant Discharge Elimination System (NPDES) and CAA permits for this proposed offshore LNG port terminal.

Background

EPA previously provided NEPA comments on the Draft EIS (DEIS) and the Final EIS (FEIS) in letters dated August 20, 2007 and October 10, 2008, respectively. Our main concern with the original 2008 project as proposed in the original EIS was that marine resources – ichthyoplankton (fish eggs and larvae) and other planktonic forms and larval life stages – would be significantly impacted by the operation of the facility at both the intake and discharge points. That is, the Applicant's proposed warming technology (HiLoad Shell and Tube Vaporizer: "HiLoad-STV") used to vaporize the cold LNG (transported by carrier at -260°F) was an open-loop design that relied entirely on GOM seawater for warming.

Because of resource agency and Alabama Governor Riley's objections, the original open-loop proposal described in the DEIS/FEIS has been re-engineered by the Applicant in the present DSEIS as a closed-loop design relying on ambient air and methanol (instead of seawater) to warm and regasify the cold LNG. Although some seawater would still be needed to cool the regasifier engine itself, significantly less volume is needed compared to the original design due to the ambient air/methanol cooling, resulting in significantly less ichthyoplankton (and other planktonic forms) being entrained. Notably, less seawater is also needed as coolant because the regasifier generates its own condensation water (Ambient Air Vaporization water) that is used as a coolant approximately one-half of the operational time. Additional seawater withdrawals are also made to cool the LNG carrier (LNGC) engines and for collecting ballast water.

DSEIS Proposed Action

EPA commends the Applicant for proposing a more environmentally preferable LNG project in the DSEIS, and the USCG for its continued coordination. The Applicant has selected the closed-loop Ambient Air Vaporizers with methanol as an Intermediate Fluid technology ("AAV-IF") as its Proposed Action. The DSEIS also offers a closed-loop Direct Vaporization Alternative technology ("DVA") as an alternate design. Overall, AAV-IF has significantly less overall environmental impacts than the original open-loop "HiLoad-STV" design, and similar or less impacts than the alternate DVA design. Both AAV-IF and DVA are proposed for the same site as the HiLoad-STV was (Main Pass Block 258: MP 258), although two nearby alternate sites were considered in the DSEIS (MP 251 and MP 257).

The AAV-IF design is a closed-loop technology that uses ambient air vaporizers and methanol aboard a Floating Regasification Unit (FRU) to provide heat to regasify the cold LNG from the LNGC. The FRU would remain anchored onsite between LNGC deliveries and therefore replace the original HiLoad-STV fixed platform. It would be equipped with a staff living area and a helipad. A HiLoad LNG off-loading and regasification unit (proprietary "HiLoad" technology) would be attached to the LNGC during deliveries and facilitate regasification, as well as metering natural gas to four pipelines interconnecting the BOET terminal to onshore facilities. The DSEIS offers two options within MP 258 to locate the Pipeline and Manifold (PLEM) for terminal mooring as opposed to the one platform site of the original HiLoad-STV proposal.

The alternate DVA technology is similar to the Applicant's AAV-IF Proposed Action except that it directly transfers cold LNG from the LNGC to the FRU via cryogenic hoses, thereby avoiding the need for (and potential spillage of) methanol as an intermediate fluid. Compared to AAV-IF, we note that DVA would be a smaller operation: 96 AAVs instead of 144, three main gas turbines instead of four, and an FRU vessel that is 100-ft shorter.

Equipment needed for either closed-loop technologies will be fabricated at existing onshore facilities. Although this will generate indirect (secondary) impacts, these facilities will be regulated by existing permits (e.g., air permits) that cannot be

legally exceeded. Nevertheless, such secondary impacts should be acknowledged in the Final SEIS (FSEIS). Both designs will also have NPDES discharges into federal waters regulated by EPA. Project discharges of routine vessel effluent (e.g., sanitary wastewater), warmed seawater effluent elevated +21°F/+12°C (from engine cooling) and cooled freshwater effluent cooled to 56°F (from AAV condensation) should not exceed NPDES permit conditions for operational discharges (pg. 4-70). Vaporized natural gas metered by the FRU to onshore pipelines will already be of pipeline quality (pg. 2-12).

EPA Comments & Concerns

Although the Applicant's closed-loop AAV-IF technology (and the DVA alternate) has significantly less overall impacts than the original open-loop HiLoad-STV technology, both closed-loop designs are not without impacts that should be minimized. EPA's remaining primary project concerns are: 1) impacts from project air emissions from the FRU, LNGC, Offshore Support Vessel (OSV) and Carrier Assist Vessel (CAV), and 2) impacts on ichthyoplankton and other plankton/planktonic life forms, primarily through seawater withdrawals (entrainment) and secondarily through effluent discharges. We offer the following comments on these concerns as well as the project alternatives (technologies and sites) presented in the DSEIS. Additional comments are also provided in the *Detailed Comments* enclosure.

**** Alternatives***

+ *DVA Technology* – Given EPA's two primary air quality and ichthyoplankton project concerns, we note that it is concluded in the DSEIS that the alternate DVA technology has "similar" or "higher" impacts than the AAV-IF technology for biological resources impacts (Table: 4.1.2-13: pg. 4-137) and "similar" air quality impacts (Table 4.1.8.6: pg. 4-235). However, while the DSEIS analysis for the Proposed Action is extensive, the same level of analysis was not found for the DVA alternative. As such, the FSEIS should substantiate or potentially modify these conclusions. Such discussion should consider that DVA is a smaller operation than AAV-IF and that the possible spillage of cryogenic LNG (DVA) would be less toxic than spillage of methanol (AAV-IF). However, if it is confirmed that AVV-IF has similar or less impacts than DVA (particularly for air quality and biological resources), EPA would prefer the Applicant's Proposed Action subsequent to modifications based on our comments and the comments of other resource and/or permitting agencies on this DSEIS and permit applications (e.g., NPDES, CAA and other permits).

+ *LNG and PLEM Sites*: EPA principally defers to the National Oceanic and Atmospheric Administration (NOAA) relative to the suitability of the proposed site at MP 258, compared to the MP 251 and 257 alternates, as well as the two offered PLEM sites at MP 258. However, the FSEIS should ensure that the selected sites would minimize hard bottom impacts during site construction and associated interconnecting pipelines, and should be adequately distant from the Pinnacle Trends. Continued coordination with NOAA is recommended.

* ***Air Quality*** – Sources of offshore air emissions are the FRU, LNGC, support vessels (OSV & CAV) during operation, and ancillary equipment associated with construction. Secondary onshore emissions from fabrication facilities would be covered within existing permits but should be acknowledged in the FSEIS.

Our primary air quality concerns are the inconsistencies in the DSEIS regarding project impact documentation and some conclusions. For clarity and accuracy, the FSEIS should provide further documentation and substantiation. For example, the DSEIS contains data gaps that are addressed in the Applicant's August 2009 supplement to the air permit portion of the July 2009 DWP License application. The additional information provided in this supplement does not appear to have been incorporated in this DSEIS. Other specific air quality concerns are provided in the attached *Detailed Comments*.

* ***Ichthyoplankton*** – We appreciate that significantly less ichthyoplankton (and other planktonic forms) would be entrained and killed with either of the closed-loop technologies presented in the DSEIS compared to the original open-loop HiLoad-STV technology preferred in the original FEIS. Although several scenarios estimating the level of ichthyoplankton impacts are discussed in the DSEIS, the "worst-case" data (365 days/yr of operation) used in the document are 26.12 million gallons of seawater intake per day and loss of 131 million fish eggs and 261 million fish larvae through entrainment/impingement on intake screens (pg. 4-114). Accordingly, compared to the original open-looped High-Load-STV technology,[1] less than 20% of the ichthyoplankton would still be impinged/entrained and killed through seawater withdrawals for cooling the FRU and LNGC engines and for LNGC ballast water.[2] Regarding any further reductions in project impacts to ichthyoplankton and other planktonic forms, EPA gives deference to NOAA and other resource agencies in coordinating any such techniques with the USCG and the Applicant. We recommend, however, that the use of AAV water for cooling is maximized to minimize seawater intake and that project ichthyoplankton losses be monitored and compared to the above predictions.

For documentation clarity of project impacts to ichthyoplankton, EPA recommends that the FSEIS provide a consolidated comparison between the number of eggs and larvae entrained (FRU, LNGC, ballast, other) for the open-loop technology preferred in the FEIS (HiLoad-STV) versus the two closed-loop technologies presented in the FSEIS (AAV-IF and DVA). This table should also be presented by various operational levels such as 1) worst-case (365 days/yr), 2) expected case (272.5 days/yr), 3) without use of AAV condensation water as a coolant, 4) with use of condensation water as a coolant, and 5) any other scenarios that reduce or increase seawater intake.

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[1] For the Hi-Load-STV design preferred in the FEIS, 761 million fish eggs and 1.5 billion fish larvae were predicted to be impinged/entrained during an average daily project intake (pg. ES-8).

[2] We also note that other ichthyoplankton could be sublethally or lethally affected by project discharges into the GOM. Overall, it should also be noted that other planktonic forms (i.e., non-fish eggs and larvae) such as zooplankton and crab larvae would also be entrained by the project.

Summary

EPA commends the Applicant for proposing a more environmentally preferable LNG project in the DSEIS, and the USCG for its continued coordination. Although the Applicant's proposed closed-loop AAV-IF technology (and the DVA alternate) has significantly less overall impacts than the original open-loop HiLoad-STV technology, both closed-loop designs are not without impacts that should be minimized. EPA's remaining primary concerns are project air emissions from the FRU, LNGC and support vessels during operation, and impacts on ichthyoplankton and other planktonic forms primarily through impingement and entrainment by seawater withdrawals.

Our air quality concerns center on the inconsistencies in the DSEIS regarding impact documentation and some conclusions. For clarity and accuracy, the FSEIS should provide further documentation and substantiation. Regarding project impacts to fish eggs and larvae, EPA recommends that potential additional approaches to further minimize the level of planktonic mortality due to the project be discussed in concert with NOAA and other relevant resource agencies and incorporated in the FSEIS, and that project operation be monitored for losses of ichthyoplankton.

EPA DSEIS Rating

EPA rates this DSEIS as an "EC-2" (Environmental Concerns with additional information requested). We strongly support the use of the AAV-IF closed-loop design and consider it to be the environmentally preferable design. The Proposed Action would nevertheless result in ichthyoplankton and air quality impacts, which should be further addressed in the FSEIS.

We appreciate the opportunity to review the DSEIS. If you wish to discuss EPA's comments, please contact me at 404/562-9611 (mueller.heinz@epa.gov) or Chris Hoberg of my staff at 404/562-9619 (hoberg.chris@epa.gov).

Sincerely,

Christin M. Hoberg / for

Heinz J. Mueller, Chief
NEPA Program Office
Office of Policy and Management

cc: Miles Croom – NOAA (pdf email)
Yvette Fields – MARAD (pdf email)
Hannah Kawamoto – USCG (pdf email)
Mark Thompson – NOAA (pdf email)

DETAILED COMMENTS

AIR QUALITY

Beyond the summary comments in the covering letter, we offer the following detailed air quality comments:

General Comments

August Supplement: On August 18, 2009, the Applicant provided EPA with a supplement to the air permit portion of the July 2009 Deepwater Port License application, as well as additional information in response to EPA's completeness comments on their license application. This information answers many of our original questions and concerns. However, the information in the Applicant's supplement does not appear to have been incorporated into the DSEIS with respect to air quality; the DSEIS contains several of the same data gaps and inconsistencies that were in the original application. Hence, we have reiterated those concerns that are applicable to the information presented in the DSEIS.

Purpose/Role of SEIS: The purpose for the development of the SEIS and its relationship to the previous EIS should be more clearly explained. As provided in Section 3, *Affected Environment*, it is suggested that each section identify the appropriate portions of the 2008 FEIS sections that remain appropriate and applicable for this project.

Executive Summary

Executive Summary; Page ES-20; Lines 8-9: The last sentence of this paragraph does not appear to addresses the BOET impacts. The impacts of other deepwater ports in the GOM are discussed in the next two paragraphs. Therefore, it is suggested that this sentence be deleted in the FSEIS.

Executive Summary; Page ES-20; Line 12: EPA recommends that for accuracy and clarity, the word "area" in the sentence starting on this line be removed. The sentence should read: "The cumulative air emissions associated ..."

Section 4. Impacts from the Proposed Action & Alternatives

Section 4.1.8.1; Page 4-208; Lines 7-9; Evaluation Criteria: For clarity and accuracy, EPA recommends the following revision to the first sentence of this section: "The potential impacts on local and regional air quality conditions *from* a proposed action are determined by the increases in regulated pollutant emissions *and* ambient air quality *impacts*."

Section 4.1.8.1; Page 4-209; Lines 20, 27-29: For clarity and accuracy, EPA recommends that the text indicate that PM10 and PM2.5 pollutants are based on values that are "less than or equal to," rather than "values less than," as stated in this section. Also, this section should indicate "particulates of 2.5 microns or less," rather than "2.4 microns," make up the PM2.5 pollutant. Finally, EPA recommends that it is more accurate to indicate that the referenced coastal states, such as Alabama and Florida, are "designated" attainment, rather than "in attainment" (see line 26). Portions of these coastal areas have monitored violations of the standards in recent years.

Air Quality Impacts for PM 2.5: Section 4.1.8.1 indicates that ambient impacts of PM10 are used as a surrogate for PM2.5 in lieu of direct PM2.5 emissions and ambient impact data in accordance with EPA guidance (USEPA 1997). EPA has since finalized a rule on the *Implementation of the New Source (NSR) Program for Particulate Matter Less Than 2.5 Micrometers*. (See FR 28321, May 16, 2008)

If the Applicant chooses to use PM10 as a surrogate for PM2.5, the application must contain an adequate rationale to support the use of the PM10 surrogate approach for this specific project. Federal courts have held that a surrogate may be used only after it has been shown to be reasonable to do so under the facts and circumstances of the specific project at issue (See e.g., *Sierra Club v. EPA* , 353 F.3d 976, 982-984 (D.C. Cir. 2004); *Mossville Envt'l Action Now v. EPA,* 3 70 F. 3d 1232, 1242-43 (D.C. Cir. 2004); *Bluewater Network v. EPA,* 370 F.3d 1, 18 (D.C. Cir. 2004)).

Section 4.1.8.1; Page 4-212; Lines 25-28; Title V Operating Permit: This paragraph indicates that the Applicant will submit a Title V permit application at some future date. EPA recommends that this paragraph be revised to reflect that the Applicant has submitted a Title V application as part of the Deepwater Port License application. This information is accurately reflected on page 2-226. However, this later reference should include the August 2009 supplement.

Section 4.1.8.1; Page 4-213; Lines 19-20; General Conformity: For accuracy, EPA recommends that the phrase "as part of the air permit process," be deleted.

Section 4.1.8.2; Page 4-215; Lines 5-6; Ambient Air Quality: The last sentence of the first paragraph on this page is unclear. EPA suggests that the sentence end with "construction" and the remainder used in another sentence (i.e., "These emissions would consist primarily ...").

Section 4.1.8.2; Page 4-217; Line 18: The "hoteling" emissions generated during unloading are part of the unloading process and considered primary emissions. As indicated in other reports (i.e., New Design Environmental Report Volume VI Section 4, Page 4.1.8-9), maneuvering and hoteling emissions (i.e., emissions associated with essential ship functions but not including emissions associated with LNG off-loading) are secondary mobile source emissions.

Table 4.1.8-3; Page 4-218; Expected Emissions During BOET's Operation from Stationary Sources: Comparing this table with the same table in the 2008 FEIS reveals a number of additional sources and changes in common sources. This table shows general agreement with the emissions provided in the TORP 2009 reference (Revised Air Quality Technical Support Document) but with small differences. An explanation in the FSEIS for the differences from 2008 FEIS would be of value. Also, emissions associated with hoteling during LNG off-loading should be included in the LNGC off-loading category in this table.

Table 4.1.8-4; Page 4-219; Expected Emissions from BOET Mobile Source Operations for the AAV-IF (closed-loop) Design: Comparing this table with the same table in the 2008 FEIS reveals a number of additional sources and changes in common sources. An explanation in the FSEIS for the differences would be of value.

Section 4.1.8.2; Page 4-219; Lines 5-20: This section (*Planned and Unplanned Maintenance and Emergencies*) does not appear to be a subsection of *Operation Impact*, but a new section. EPA recommends that this information be included in a separate section with the same format as *Operation Impact* (see also Section 4.1.8.4; Page 4-222; Lines 15-30).

Section 4.1.8.3, Page 4-220; Lines 4-27; Ambient Ozone: The last sentence of the first paragraph starting on line 15 is unclear. EPA recommends the following revised statements: "Emissions from sources offshore contribute to regional air quality burden as well. As distance offshore increases, the contributions of offshore NOx and VOC emissions to land and near shore ozone levels becomes less."

This section does not include the paragraph from the 2008 FEIS showing Compass Port's impacts as negligible. EPA recommends that this information be included or referenced in the FSEIS, because it provides the basis for BOET's small impact when compared to Compass Port.

The BOET project emissions provided on line 19 do not appear to agree with the values provided in Tables 4.1.8-3. EPA recommends that these values be verified and revised as appropriate.

Table 4.1.8-6; Page 4-223; Estimated Carbon Dioxide Equivalent Emissions from the Alternatives: The last sentence of footnote "b," regarding vessel emissions, should be deleted. This sentence is only applicable in the context of footnote "c".

Section 4.1.8.4; Page 4-224,225; Lines 18, 19, 25, 37, 38, and 41: The following comments are associated with the *Impact Analysis* sub-section.

1. The highest greenhouse gas (GHG) alternative emissions in Table 4.1.8.4-6 is 201,088 metric TPY which is equivalent to 36,561 vehicles, not 145,457 as given on line 19.
2. The percent of total registered vehicles should be 0.06% to 0.08% on line 25.

3. BOET's worst emissions in Table 4.1.8-6 presented in lines 37-38 do not appear to be correct. The worst emissions are 201,088 MT, which is 0.003% of the U.S. national fossil fuel combustion total. BOET's worst-case emissions of 201,088 MT in Table 4.1.8-6 would be 0.0007% of the global GHG emissions not 0.003% provided in line 41.
4. EPA believes there is a typographical error regarding total reported GHG emissions. The value on line 2, page 225, should likely be "27,638,631," rather than "27,638.631."

Section 4.1.8.5; Page 4-227; Line 15; Permit Requirements: The total project emissions, not just the primary emissions, are typically used to assess the AQRV impacts. EPA recommends that total project emissions be included in this analysis, or the FSEIS should provide a discussion of this atypical approach.

Table 4.1.8-9; Page 4-229; Annual and Maximum Short-Term Emission Rates for Secondary (Mobile) Sources (grams/second): EPA believes this table contains a typographical error. The CO emission rates for Offshore Service Vessels for both 8-hour and 3-hour should be 1.37 g/s not 137 g/s.

Section 4.1.8.5; Page 4-229; Line 4: EPA believes this sentence contains a typographical error: "301 mi" should be "31 mi".

Table 4.1.8-11; Page 4-230; Comparison of Primary and Secondary Emission Source Near-field Model Results with NAAQS and PSD Increments: The maximum cumulative concentrations provided in this table exceed the NAAQS for PM10 annual and 24-hour periods, and the PM2.5 annual standard. These modeled NAAQS violations need to be acknowledged and addressed.

Section 4.1.8.5; Page 4-231; Line 18-19 and 24: This far-field modeling section addresses impacts to both PSD Class I areas and the nearest onshore land, the barrier islands. PSD Class I area cumulative modeling is generally only for PSD increment compliance assessment and not NAAQS. An approximate NAAQS compliance assessment was provided for the far field barrier islands. EPA recommends that this distinction be made in the text on lines 18-19. In addition, because cumulative PSD increment modeling was not performed, EPA recommends that the phrase "the Class I increments and" be deleted from line 24.

Table 4.1.8-13: Page 4-232; Class II Far-Field Modeling Results – Primary and Secondary Sources-NAAQS: Because no cumulative NAAQS compliance modeling was performed, it is suggested that a footnote be added to this table explaining that comparison of the maximum project emissions impacts plus background ambient concentrations to the NAAQS is an approximation. A NAAQS compliance assessment would include other nearby emission sources in the modeling.

Table 4.1.8-12; Page 4-231; Class I (Breton NWR) Significant and Project Impact Modeling Results: Although there is no PM10 annual NAAQS, there is an annual PM10 PSD increment. For completeness, EPA recommends that PM10 annual increment results be added to this table.

Section 4.1.8.5; Page 4-234; Line 7-11: The possible 24% increase in AERMOD modeled concentrations discussed in this section would cause NO_2 project impacts greater than the SIL in Table 4.1.8-10 and PM2.5 impacts greater than the NAAQS in Table 4.1.8-11. Hence, the statement that it does not appear these higher results will cause non-compliance is misleading. Re-modeling to provide appropriate impacts may be warranted, as well as further discussion on typical vs. maximum impact operating scenarios.

Section 6. Cumulative Impacts

Section 6.2.8; Page 6-39; Lines 4-9: Cumulative Impacts on Offshore Air Quality: The conclusions provided in the sentence starting on line 4 have not been demonstrated. Only an approximate NAAQS compliance assessment was provided as nearby emissions sources were not included in the modeling. Therefore it is suggested that the statement that "cumulative air quality emissions from existing and proposed onshore and offshore facilities would have short-term impacts on coastal areas" be deleted. However, the provided analyses did demonstrate BOET's contribution to air quality in these areas would be minor – less than the SIL. The provided approximate NAAQS compliance assessment did show impacts less than the NAAQS except for the pollutants and time periods noted in Table 4.8.1-11 above. In addition, the reference to Section 4.1.8.4 on line 7 should be Section 4.1.8.5.

Appendix F. Air Quality Information

Table 4.1.8-3 of the DSEIS summarizes the annual stationary source emissions expected during operation of the BOET project. Based on our review of this information, as well as the detailed calculations found in Appendix F, we have the following comments concerning the air emissions estimates:

1. Appendix F includes many detailed emission estimates; however, it is unclear where many of the emission factors originated. From our earlier reviews, is seems many of the emission factors were included in Appendix C of the Deepwater Port (DWP) Application. The location of the emission factors and/or the relevant information contained in the DWP Application should be referenced in the FSEIS. Appendix C of the DWP application, however, does not contain sufficient information regarding emission factors for startup and shutdown emissions from the turbines. This information should also be included or referenced in the FSEIS.
2. There are inconsistencies between the emissions in Table 4.1.8-3 and the detailed calculations provided in Appendix F; clarifications are needed in the FSEIS and/or corrections are necessary to verify the annual emissions and that the project will be a minor source.

a. The table titled "Turbines – Annual Emissions" on page 48 of Appendix F indicates annual NOx emissions of 19.24 TPY (based on 7,456 hr/yr and a capacity factor of 0.84). This value is inconsistent with the 59.48 TPY annual NOx emissions for three turbines included in Table 4.1.8-3, which seems to be based on 19.83 TPY for each of three turbines.

b. The inconsistency described above is also true for the remaining pollutants included in the analysis (SO_2, VOC, PM10, and CO) for all the Turbine Generators.

c. Table 4.1.8-3 includes emission estimates for "LNG Carrier Off-Loading" of 60.50 TPY of NOx. Appendix F includes a subsection titled *LNG Carrier Unloading Emissions* with three separate tables (page 51-53). The annual NOx emissions from all three tables total 235.4 TPY, which is a much larger estimate of annual NOx emissions associated with the Carrier during off-loading activities.

d. The inconsistency described above is true for the remaining pollutants included in the analysis (SO_2, VOC, PM10, and CO) of the Carrier off-loading emissions.

e. Table 4.1.8-3 includes emission estimates for two FRU generators of 55.56 TPY of NOx. Appendix F includes two separate tables (pages 44-45) estimating FRU Generator annual emissions from diesel fuel and gas, respectively. The tables indicate annual estimates of NOx emissions for each FRU of 174.66 TPY from diesel fuel and 26.30 TPY from gas. This information is inconsistent with estimates included in Table 4.1.8-3 and it is unclear how this information was used to estimate the annual NOx emissions reported.

f. The inconsistency described above is true for the remaining pollutants included in the analysis (SO_2, VOC, PM10, and CO) of the FRU Generator emissions.

3. Appendix F (pg. 30) includes a table estimating startup/shutdown emissions for the turbines. Table 4.1.8-3 does not include any emission estimates for startup/shutdown of the turbines. Start-up and shut down emissions must be accurately estimated and included as primary emissions estimates of the source.

4. Table 4.1.8-3 includes emission estimates based on the operation of three turbines and two FRU Generators. However, according to Table 4.1.8-2 the source will actually have four turbines and four generators physically located on the FRU. It is our understanding that the Applicant plans to take enforceable restrictions to only allow operation of three turbines and two generators at any one time in order for the emissions estimates to remain valid. This restriction is alluded to in the first two sentences on page 4-217. However, EPA recommends that the planned operation and any operating restrictions be clearly discussed in Section 4.1.8 of the FSEIS.

5. The table titled "Turbines – Annual Emissions" on page 48 of Appendix F includes a 0.84 "capacity factor" in the calculation of tons per year for all pollutants. Given that

this is not a standard approach, EPA requests that clarification of and justification for the use of this factor be explained in the SEIS.

Other Comments

Acronyms (Page xvii): "HP" is given as "horsepower" in the glossary of abbreviations. However, the DSEIS also uses "HP" as an abbreviation for "high pressure."

ICHTHYOPLANKTON

Estimates for seawater intakes and impacts to fish eggs and larvae should be more consolidated in the FSEIS, and apparent inconsistencies revisited. We offer the following observations and recommendations:

Natural vs. Project Mortality – In response to the predicted project loss of fish eggs and larvae, the DSEIS states (pg. 4-114) that: "However, more than 90% of the eggs and larvae potentially entrained in the system are not expected to survive to adulthood (even if not entrained) due to natural mortality."[3] EPA does not fully agree with this rationale. While it is clear that many larval fish naturally die before maturity, we suggest that using this logic to minimize their early removal from the biota by the project is an oversimplification. The premature removal of these forms due to the project would imply that other surviving larval forms could be further stressed by predators (even though we agree that dead entrained material returned to the GOM could still be scavenged as forage). Survival rates could also be patchy in different marine habitats and therefore may or may not exceed the average 10% survival rate (= 90% mortality rate) referenced above, at the terminal. Additionally, the aggregation of eggs and larvae have indirect fishery value to the marine food web regardless of whether or not they survive to maturity or are consumed by predators.

Operational Timeframes: The impingement/entrainment losses for the Proposed Action (AAV-IF) are listed (pg. 4-114) as 131 million fish eggs and 261 million fish larvae each year, assuming a worst-case operation of 365 days/year. However, the actual operations of the BOET terminal is expected to be 272.5 days/year, some three-fourths of the worst-case timeframe. Moreover, the AAV-generated condensate could be used instead of seawater for engine cooling which is expected to be available for some one-half of the time. These savings should translate into less ichthyoplankton entrainment and mortality. Fish eggs and larvae estimates for these less conservative scenarios should also be provided in the FSEIS.

Summary Table: Overall, EPA recommends that the FSEIS provide a consolidated comparison between the number of eggs and larvae entrained (FRU, LNGC, ballast, other) for the open-loop technology preferred in the FEIS (HiLoad-STV) versus the two closed-loop technologies presented in the FSEIS (AAV-IF and DVA). This table should also be presented by various operational levels such as 1) worst-case (365 days/yr), 2) expected case (272.5 days/yr), 3) without use of AAV condensation water as a coolant, 4) with use of condensation water as a coolant, and 5) any other scenarios that reduce or

[3] A citation should be provided for this conclusion in the FSEIS.

increase seawater intake.

Page ES-8: On page ES-8 of the Executive Summary, it is stated that: "The estimated numbers of fish eggs and larvae that would be entrained by the proposed BOET STV operations under an average annual intake scenario would be 761 million eggs and 1.5 billion larvae." It is unclear why the BOET STV project (= HiLoad-STV design) preferred in the FEIS would be termed the "proposed" operation in the DSEIS and why the ichthyoplankton impacts for the original project would be listed instead of those of the Proposed Action (AAV-IF). We assume this was inadvertently included since the text (pg. 4-114) states that the Proposed Action impacts are 131 million fish eggs and 261 million fish larvae each year. The FSEIS should discuss or correct this inconsistency.

Table 4.1.2-7: This table (pg. 4-112) indicates that a total of 26.14 mgd of seawater would be needed to cool the FRU (1.12 mgd) and LNGC (1.12 mgd) engines and to collect ballast water (23.9 mgd). Although a minor difference, the value used for calculations in the DSEIS text is 26.12 mgd. The FSEIS should discuss this or make consistent.

Proposed Action vs. DVA Alternative: Although page 4-114 references the losses for fish eggs and larvae for the Proposed Action, it is unclear if the DVA alternative would or would not have the same estimates. We note that this design would be a smaller operation in terms of the number of AAVs (96 vs. 144), gas turbines (3 vs. 4), and the size of the FRU vessel (100-ft shorter). This smaller size suggests that less cooling water might be needed and therefore less seawater withdrawn and ichthyoplankton entrained. The FSEIS should confirm that impacts of AAV-IF and DVA are indeed comparable or provide separate estimates for the DVA alternative.

ALTERNATIVES

General: The FSEIS should expand the *Table of Contents* in the DSEIS to list all major subsections provided in the text (e.g., the lengthy 4.1.2 *Biological Resources Impacts* section is not subdivided into subsections for easy reference). Moreover, although summary tables exist in the DSEIS for individual impacts, we suggest that the FSEIS provide a summary table comparing all major impacts for the AAV-IF, DVA and HiLoad-STV alternatives to facilitate the comparison of alternatives. Beyond such comparison of environmental impacts, we suggest that any non-proprietary engineering advantages/disadvantages of each of the three warming technologies also be summarized in the FSEIS.

Proposed Action (Sec. 2.1): The operation and components of the Proposed Action are described in this section. We note that the project would still accomplish revaporization on the HiLoad facility and not on the FRU. The Applicant proposes to utilize shell-and-tube process. An intermediate fluid for heating is generated by the AAV on the FRU and then run via flexible hose to the HiLoad. This is a concern because it possibly allows the port to revert to the original open-loop mode using seawater as a backup when the AAV is inoperable. EPA does not favor such an open-loop design, even as a backup. The

FSEIS should discuss the probability of the port reverting to such a technology.

DVA (Sec. 2.2.2): The DVA (on the FRU) is addressed, but it is not explained why this option is not the preferred. It would seem to simplify the process and be less costly because all of it would be aboard the FRU and eliminate the need for an IF and transfer to the HiLoad. The HiLoad then would be solely for unloading and transfer of the LNG to the FRU. All that would be needed is a cryogenic hose connection from the LGNC to the FRU, presumably similar to inshore ports like the Elba LNG (GA). The FSEIS should discuss this further.

OTHER COMMENTS

We offer these additional comments:

Impacts (Sec. 4): Based on page 4-80, one of the pipeline connection lines would be just 150 feet from a Pinnacle. As EPA indicated in previous BOET comments, pipeline placement and construction should not disturb hard bottom habitats. What effects would such 150-ft proximity have on the Pinnacle Trends given that MMS regulations do not require burial at depths greater than 200 feet?

Methane Spills (Sec. 5.2.2): The FSEIS should discuss the resultant size (zone of impact on the water surface) of the evaluated methane spill volume evaluated in this section.

Safety: Although EPA principally defers LNG transit/terminal safety to the USGC and MARAD, we note that only eight incidents have occurred worldwide since 1964 that resulted in LNG spills, and none resulted in a fire. Overall, deepwater ports appear safer than inshore terminals. For the proposed BOET, we note that there are alternative pipeline routes to shore and some are planned to be available in the event the primary one (if there is one) is unavailable. However, the destination of an LNG cargo is unclear if no port pipeline is available. The FSEIS should discuss this.

It appears that LNG transit still is the greatest safety factor. We note that separate inbound and outbound carrier routes should lessen the collision concern, the nearest navigation fairway is more then 12 miles distant from the port, and every LNG vessel coming to a US port must be inspected by the USCG prior to docking.